

Tells Effects of Soil Conditioner on New California Course

By EDWARD C. KNIGHT

WE began the development of the first nine at North Ridge CC without including a chemical soil conditioner in our plans. When it was suggested that Krilium Loamaker would maintain porosity, aeration and water percolation of our somewhat difficult soil and reduce compaction, drying out and erosion, I had no first hand experience on which to base my decision.

However, I was ready to agree in principle with this type of soil conditioning. The old methods require the use of soil banks, composting sites, mulches, peat moss and mixing pits. With them goes the necessity of conveying, applying and surfacing. Labor costs for this work must be added to the already high material costs. Something must be done to reduce these costs.

Compaction is the number one problem on golf courses and always leads to poor aeration. In compacted soil, carbon dioxide is trapped in the root zone, preventing replacement by oxygen. These conditions create unthrifty plant growth and will lead to disease. Compaction also prevents the movement of fertilizer down into the root zone. Fertilizer on the surface cannot do its job and is apt to cause salt burn. From the golfer's standpoint compaction cuts down enjoyment of the game.

Every course is different, due to varying soil and climatic conditions, resulting in varying degrees of erosion, compaction and subsequent root development. Deep roots indicate adequate porosity or absence of compaction. Deep rooted grass aids in combating erosion and withstands drying summer heat. It also means that the turf recovers faster from divots, spike tears, and ball pits. Thus, a thoroughly homogeneous deep seed bed, one in which the soil structure, and thereby the porosity, is maintained, is the basic prerequisite to good turf.

We first roto-tilled Krilium into the soil



Erosion in untreated soil resulting from heavy rainfall 16 days after seeding. Runoff from 20,000 sq. ft. cut this 18-in. deep trench which is about 3-ft. wide. Ed Knight, author of this article, says his crew had no erosion repair work whatever in areas where soil had been treated with Krilium.

of eight greens, the practice putting green and the three par tees of the first nine at North Ridge. Later we extended this treatment to include all the greens, aprons and collars, and 3-par tees of the second nine.

Within a year indications pointed toward the solution of the basic problem, and the club officials were enthusiastic.

Besides the physical evidence of actual comparison of root growth in treated vs untreated soil, we had enough experience to know that Krilium has maintained greater porosity, aeration and water percolation; has controlled erosion and not only produced better root development and healthier turf, but has also greatly facilitated watering and fertilizing. This means better playing conditions now, and should mean a reduction in maintenance costs.

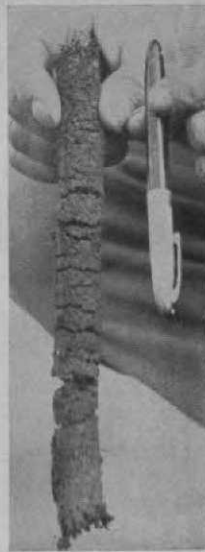
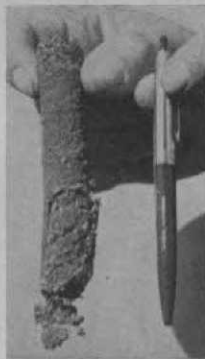
North Ridge is one of the newest 18 hole courses in Northern Calif. It's located half way between Sutter's Fort and Coloma, the site of the original discovery of gold by John Marshall, on 200 acres of rolling oak dotted terrain a few minutes drive northeast of Sacramento. The site includes some 60 acres which are set aside as homesites for members.

A young, diversified group, headed by J. F. Brady and E. J. Duffy, formed a non-profit corporation, elected officers, and began the long and complicated task of planning and building an 18-hole golf course, clubhouse and swimming pool. Memberships now are over the 500 mark.

Bells Designed Course

The late Wm. P. Bell and son, Wm. F. Bell, were engaged to design the course. I had worked with them previously in the construction of the Bakersfield, (Calif.) CC and it was in this area I learned to keep an eye open for new methods that might solve maintenance problems. Prior to coming to Sacramento I was superintendent at Buena Vista GC and helped Eddie Novak build the Bakersfield Public GC. Before that I was in golf course construction and maintenance work in the L. A. area and found a marked difference in maintenance between coastal areas and the hot inland valleys.

After I arrived in Sacramento and inspected the site, I found an ideal location for what Billy Bell had designed; 18 championship holes, 58 sand traps with natural drainage, elevated tees and enormous varied greens averaging over 6000 sq. ft. of putting surface; all this set in among rolling hills and gullies with just the right degree of steepness and variety;



Plug on left measured only 5-in., altho its period of root growth was 54 days longer than 9 3/4-in. plug on right, which is from a Krilium-treated green. Latter was treated with 2 lbs.

of Loamaker per 100 sq. ft., roto tilled to a depth of 6-ins. in two directions and then graded, fertilized and seeded.

numerous big oak trees, a spectacular setting for the clubhouse on an oak-topped knoll. The over-all elevation provides an unusual panorama of the flat Sacramento Valley and the lofty Sierras to the east with their wintertime mantle of snow.

Inspection also showed deep erosion gullies. Soil analysis showed a decomposed granite type soil consisting of 78% coarse and fine sands, 11% silt and 11% clay. Aggregation tests, using the wet sieve method, showed a natural aggregate stability of 62% (after treatment with Krilium this jumped to 95%, but more of that later). This meant that with the normal rainfall expected, 21 in. annually, mostly in Dec., Jan., and Feb., we were going to have erosion trouble on any new seeded area we tried to bring up during those months. And, since our summer temperatures might go as high as 110 degrees, accompanied oftentimes by hot, dry north winds, we could have erosion troubles then too because of the copious amounts of water required to bring up new seed under these conditions. Since the soil melted so rapidly it was also evident that we would be faced with compaction problems in the immediate future.

Such seemingly unrelated events as a torrential rain, an early morning walk and a midnight ride by pranksters (?) all had a share in the development of North Ridge, and also an important bearing on the use and evaluation of Krilium.

Treatment of our soil with Kriliium Loamaker was first given serious consideration in April, 1954. We had one green (No. 3) with grass showing and all other greens and tees 95% complete with the exception of seeding, when we decided to make a comparative test with treated vs untreated soil. No. 6 green was divided down the middle and Kriliium was applied with a fert. spreader at the rate of 2 lbs. per 100 sq. ft. The entire greens area was then roto-tilled twice to a depth of 6 in. The soil was dry on the immediate surface but had good working moisture below. An excellent seed bed was prepared over the entire green. At the time we were preparing this green, another crew was seeding No. 4 green. Two days later, before we had time to seed No. 6, an unseasonal, torrential rain fell - 1-1/2 in. in 24 hours.

The morning after the rain, I was accompanied on an inspection tour by R. L. Richards, club pres. and W. P. Anderson, club secretary and director of the North Calif. Golf Assn. All the roughed-in areas had puddled considerably, were soft and muddy and much of the course was criss-crossed with deep erosion gullies. No. 3 green was in fairly good shape because the grass was up. No. 4 was washed out and would have to be reseeded. The course was a sorry sight.

As we approached No. 6, we noticed at once a definite difference between treated and untreated areas. The untreated was puddled and it didn't take a magician to see that the surface structure was gone and that there was going to be a bad crust to work on. The treated area was still well aggregated. As I walked across the untreated half I sank ankle deep and water rose in my tracks. I stepped across the center line and was really surprised. I had to exclaim "Why it's just like stepping upstairs!" The treated area felt firm. There was no puddling or standing water.

We learned some things using 1200 lbs. of Kriliium on the first nine that we feel were improved upon in the second which accounted for the use of 1800 lbs.

It was found that the treated greens took water so much better than the untreated shoulders and aprons, that we couldn't take full advantage of what we had. We could soak the greens but had to come back and hit the aprons and shoulders again before the greens needed it. This was because most of the water ran off the untreated areas. On the second nine we treated greens, aprons and shoulders.

We also found that traffic between the

green and the traps packed the soil so badly we had difficulty keeping a stand of grass. Treating this area has eliminated the problem on the second nine.

One night pranksters (?), probably school kids, wired around the switch of one of our loaded 3/4 ton trucks an dtook a ride. It wasn't enough to drive around the fairways; they made a "U" turn on No. 5 green! And our course opening just 5 days away! To make matters worse, the green had been generously watered that same evening. Normally, we would have found it necessary to lift the sod, repair the base, relay the sod, and topdress. But amazingly enough, all we found was bent and broken grass, no ruts or mounds to repair.

From this incident we concluded that if aggregation and porosity are maintained, water can move freely through the soil. There will be no excess water near the surface that makes the soil muddy and subject to damage from unexpected traffic such as we had.

This seems to me to be the most significant feature of the treatment. The soil remains aggregated and porous, yet remains firm.

Seeding of the first nine was completed on June 4, 1954 and opened for play 90 days later, on Labor Day weekend, Sept. 4-5-6. The second nine was seeded in October and in spite of unusually cold weather, with several heavy frosts and several heavy rains, there was excellent germination and establishment of root growth in all treated areas. The greens were seeded to Seaside Bent, and the fairways and tees to a mixture of Seaside and Bermuda. The Bermuda of the second nine being held off and seeded in the spring. A 25 ft. collar of Kentucky Blue surrounds each green on the first nine and a 25 ft. collar of Merion Blue on the greens of the second nine.

A close inspection of the entire course has been made on numerous occasions and differences between treated and untreated areas are readily apparent.

1. Soil erosion from both watering and rainfall frequently starts at the very edge of treated surfaces and extends into the untreated; never into the treated soil.

2. Superior porosity, giving better aeration and water percolation in the treated soil as compared to untreated No. 3 green shows up graphically in comparative root development.

3. It is much easier to change cups in treated greens than it is in No. 3.

4. The soil of No. 3 takes less water,

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dries out and gets harder faster than the treated greens. Treated soil seems to be able to hold proper amounts of water as well as take it.

5. We are always able to get water into the root zone of the treated greens with little or no run-off at the rate we apply it. On No. 3 we have lots of run-off before we get the proper depth of penetration (when we get it).

6. On the par 3 tees (which we treated at 1 lb./100 sq. ft. and roto-tilled 3 in. deep) the story as well as his overall opinion is given by W. P. Anderson: "Turf recovery on our par 3 tees is exceptionally fast. On these tees the condition of the turf is actually better than on the par 4 tees which were not treated. The turf on our practice tee is also Krilium treated but, as on the par 3's recovery is unusually fast."

Pro. George Gargovitch said: "From the point of view of management and the golfer there is another advantage in the treated greens at North Ridge. On these greens play can be resumed as early as 3 hours after a heavy rainfall."

The direct material cost of Krilium ran approximately \$284 per 10,000 sq. ft. This was at the price of \$1.44/lb. Altogether our records show we spent less than \$5,000.00, including all labor costs, in the treatment of 17 greens, five 3 par tees and the practice tee and the practice putting green.

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New Supt., Frank Emery, Adds To Story

"I took over as Supt., on Bell's recommendation, in July, 1955, after Ed Knight left to build some more courses for Bell.

"Water penetration on the greens is everything one could ask for. Response to fertilization is very fast. Plugs taken as recently as one week ago show the roots well below 12 in. except on No. 3 where they are about 6 in. deep.

"Water penetration is not nearly as good on this untreated green and the cup is not as easily changed. We have had no compaction on the treated greens and they hold shots very well even when on the dry side. This past winter we have had one of the worst rainfall years on record. All courses in the area, with the exception of North Ridge, were shut down for varying lengths of time. We were not shut down even for one day. Our greens show excellent surface and internal drainage."

Wichita Pro Tells of Weather's Evil Blow

This spring's weather has been no bargain for pros in many sections. In checking up on the effect of the weather on play and pro shop sales, we wrote Gene O'Brien, pro at Rolling Hills CC, Wichita, Ks., among other fellows.

From many of the pros we got bad reports about rain and cold knocking down pro sales but Gene said the blow he and other Central Plains pros have been suffering came from the wind. Here's his report:

As I sit here in the old pro shop gazing out over my vacant and wind-blown course, I can hear the faint moan of a gentle 60 mile breeze. It isn't a hurricane Mable, it's only a breeze. I am a bit bitter about the weather out here in the vast plains.

During the past six or seven months we have been talking about the windy, windy weather but few of us pro boys can do anything about it. It's nothing to turn on my pro shop radar set and catch a foursome of Omaha golfers wending their way toward Oklahoma City at 2,000 feet. We usually have three or four acres of Colorado dirt flying at 500 feet to zero. Sounds like I might be stretching things a little? It's nothing for a group of my players to be blown to Kansas City one day and catch a 70 miler back the next day. Press bets at 2,000 feet is something new.

The sale of items such as chains to tie your cart up while you shoot, special concrete shoes to hold you steady while you swing, pencils for writing in dust and winds up to 70 miles per hour—things like these are going real well. The golf equipment, not so hot.

Wind Wobbles Cups

You folks out of the wind country can appreciate how tough it is to just hit the ball. Out here, the cup even wobbles around in the green. I know you won't believe that statement but, it does seem to move a little now and then.

Driving into some of our more breezier days you don't worry so much about what happens to the ball after you hit it just as long as it doesn't blow back and hurt you. We had a fellow the other day who teed off and wound up just 150 yards off line and just 100 yards back from where he started. He was tickled to death; it was the first 250 yard drive he ever hit. But anyway, with his slice he never did get there.

I am one pro who declared a disaster area for my 18 holes. Ike being a golfer and from the mid-west may show me some sympathy when I file my disaster claim.

I have always talked and griped about the weather but just couldn't ever get enough ahead when the weather was good to get out. Sure, I know that the weather is going to change one of these days. It always does about ten times a day. My father told me that 25 years ago and his father before his father told him